

CLAIMS

What is claimed is:

1. A method for detecting emotion in a voice by utilizing statistics comprising the steps of:
- (a) providing a database having statistics including statistics of human associations of voice parameters with emotions;
  - (b) receiving a voice signal;
  - (c) extracting at least one feature of the voice signal;
  - (d) comparing the extracted voice feature to the voice parameters in the database;
  - (e) selecting an emotion from the database based on the comparison of the extracted voice feature to the voice parameters; and
  - (f) outputting the selected emotion.

2. A method as recited in claim 1, wherein the database includes probabilities of particular voice features being associated with an emotion.

3. A method as recited in claim 2, wherein the selection of the emotion from the database includes analyzing the probabilities and selecting the most probable emotion based on the probabilities.

4. A method as recited in claim 1, wherein the statistics in the database include self-recognition statistics.

5. A method as recited in claim 2, wherein the probabilities of the database include performance confusion statistics.

6. A method as recited in claim 1, wherein a plurality of features are extracted including the maximum value of the fundamental frequency, the standard deviation of the fundamental frequency, the range of the fundamental

4 frequency, the mean of the fundamental frequency, the mean of the  
5 bandwidth of the first formant, the mean of the bandwidth of the second  
6 formant, the standard deviation of energy, the speaking rate, the slope of the  
7 fundamental frequency, the maximum value of the first formant, the  
8 maximum value of the energy, the range of the energy, the range of the  
9 second formant, and the range of the first formant.

1 7. A computer program embodied on a computer readable medium for detecting  
2 emotion in a voice by utilizing statistics comprising:  
3 (a) a code segment that provides a database having statistics including statistics  
4 of human associations of voice parameters with emotions;  
5 (b) a code segment that receives a voice signal;  
6 (c) a code segment that extracts at least one feature of the voice signal;  
7 (d) a code segment that compares the extracted voice feature to the voice  
8 parameters in the database;  
9 (e) a code segment that selects an emotion from the database based on the  
10 comparison of the extracted voice feature to the voice parameters; and  
11 (f) a code segment that outputs the selected emotion.

1 8. A computer program as recited in claim 7, wherein the database includes  
2 probabilities of particular voice features being associated with an emotion.

1 9. A computer program as recited in claim 8, wherein the selection of the  
2 emotion from the database includes analyzing the probabilities and selecting  
3 the most probable emotion based on the probabilities.

1 10. A computer program as recited in claim 7, wherein the statistics in the  
2 database include self-recognition statistics.

1 11. A computer program as recited in claim 8, wherein the probabilities of the  
2 database include performance confusion statistics.

120

1 <sup>14</sup> 12. A computer program as recited in claim <sup>9</sup> 7, wherein a plurality of features are  
2 extracted including the maximum value of the fundamental frequency, the  
3 standard deviation of the fundamental frequency, the range of the  
4 fundamental frequency, the mean of the fundamental frequency, the mean of  
5 the bandwidth of the first formant, the mean of the bandwidth of the second  
6 formant, the standard deviation of energy, the speaking rate, the slope of the  
7 fundamental frequency, the maximum value of the first formant, the  
8 maximum value of the energy, the range of the energy, the range of the  
9 second formant, and the range of the first formant.

1 13. A system for detecting emotion in a voice by utilizing statistics comprising:  
2 (a) logic that provides a database having statistics including statistics of human  
3 associations of voice parameters with emotions;  
4 (b) logic that receives a voice signal;  
5 (c) logic that extracts at least one feature of the voice signal;  
6 (d) logic that compares the extracted voice feature to the voice parameters in the  
7 database;  
8 (e) logic that selects an emotion from the database based on the comparison of  
9 the extracted voice feature to the voice parameters; and  
10 (f) logic that outputs the selected emotion.

1 <sup>15</sup> 14. A system as recited in claim <sup>15</sup> 13, wherein the database includes probabilities  
2 of particular voice features being associated with an emotion.

1 <sup>16</sup> 15. A system as recited in claim <sup>16</sup> 14, wherein the selection of the emotion from  
2 the database includes analyzing the probabilities and selecting the most  
3 probable emotion based on the probabilities.

1 <sup>17</sup> 16. A system as recited in claim <sup>17</sup> 13, wherein the statistics in the database include  
2 self-recognition statistics.

14

15 who

add  
A5